

CLAIMS

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What is claimed is:

1. A thread selection unit for a multithreaded processor having a plurality of active threads, the thread selection unit comprising:

a priority thread selector configured to generate a priority thread value associated with a priority thread;
an execution thread selector coupled to receive the priority thread value and to generate an execution thread value associated with an execution thread.

2. The thread selection unit of Claim 1, wherein the execution thread selector is configured to select the priority thread as the execution thread when the priority thread is unblocked.

3. The thread selection unit of Claim 1, wherein the priority thread selector selects the priority thread without regards to the actions of the execution thread selector.

4. The thread selection unit of Claim 1, wherein the priority thread selector comprises a plurality of maxtime registers, wherein each active thread has an associated maxtime register.

5. The thread selection unit of Claim 4, wherein the priority thread selector further comprises a priority thread counter configured to provide the priority thread value to the execution thread selector.

6. The thread selection unit of Claim 5, wherein plurality of maxtime registers provides a maxtime value corresponding to the priority thread value.

7. The thread selection unit of Claim 6, wherein the priority thread selector further comprises:

a counter; and

a comparator coupled to the counter and the plurality of maxtime registers, wherein the comparator is configured to compare a count value of the counter with the maxtime value from the plurality of maxtime registers.

8. The thread selection unit of Claim 7, wherein the priority thread counter is incremented and the counter is reset when the count value equals the maxtime value.

9. The thread selection unit of Claim 4, wherein the priority thread selector further comprises an internal thread counter configured to provide an internal thread value to the maxtime registers.

10. The thread selection unit of Claim 9, wherein plurality of maxtime registers provides a maxtime value corresponding to the internal thread value.

11. The thread selection unit of Claim 10, wherein the priority thread selector further comprises:

a counter; and

a comparator coupled to the counter and the plurality of maxtime registers, wherein the comparator is configured to compare a count value of the counter with the maxtime value from the plurality of maxtime registers.

12. The thread selection unit of Claim 11, wherein the internal thread counter is incremented and the counter is reset when the count value equals the maxtime value.

13. The thread selection unit of Claim 11, wherein the priority thread counter is incremented and the counter is reset when the maxtime value equals zero.

¹⁴ ~~13.~~ ^{GAP} The thread selection unit of Claim 12, wherein the priority thread selector further comprises a priority thread register configured to receive the internal thread value and the provide the priority thread value, wherein the priority thread registers stores the internal thread value when the maxtime value is not equal to zero.

¹⁵ ~~14.~~ ^{GAP} The thread selection unit of Claim 1, wherein the execution thread selector comprises:

a thread block checker configured to provide a plurality of block values, wherein each active thread has a corresponding block value;

an execution thread register configured to provide the execution thread value; and

a comparator configured to compare the priority thread value with the execution thread value and to generate a comparison result.

¹⁶ ~~15.~~ ^{GAP} The thread selection unit of Claim 1, wherein the execution thread selector further comprises a controller coupled to receive the block values, the priority thread value, the comparison result, and the execution thread value and configured to generate a next execution thread value for the execution thread register.

¹⁷~~16~~ ^{GAP}. The thread selection unit of Claim ¹⁶~~15~~ ^{GAP}, wherein the controller generates the next execution thread value to be equal to the priority thread value when the priority thread is not blocked.

¹⁸~~17~~ ^{GAP}. The thread selection unit of Claim ¹⁷~~16~~ ^{GAP}, wherein the controller generates the next execution thread value to not be equal to the priority thread value when the priority thread is blocked.

¹⁹~~18~~ ^{GAP}. A method of selecting an execution thread from a plurality of active threads in a multithreaded processor, the method comprising:

- selecting a priority thread;
- selecting the priority thread as the execution thread, when the priority thread is unblocked.

²⁰~~19~~ ^{GAP}. The method of Claim ¹⁹~~18~~ ^{GAP} further comprising selecting a non-priority thread as the execution thread when the priority thread is blocked.

²¹~~20~~ ^{GAP}. The method of Claim ²⁰~~19~~ ^{GAP}, wherein the selecting a priority thread comprises:

- assigning a maxtime value for each active thread;
- selecting a next thread as the priority thread when the priority thread has been the priority thread for a maxtime number of cycles.

²²~~21~~ ^{GAP}. The method of Claim ²¹~~20~~ ^{GAP}, wherein the selecting a next thread as the priority thread when the priority thread has been the priority thread for a maxtime number of cycles comprises:

incrementing a priority thread counter when a count value equals the maxtime value corresponding to the priority thread; and

resetting a counter when the count value equals the maxtime value corresponding to the priority thread.

²³ ~~22~~ ^{GAP} 21 ^{GAP} 20. The method of Claim ~~20~~, wherein the selecting a next thread as the priority thread when the priority thread has been the priority thread for a maxtime number of cycles comprises:

incrementing an internal thread counter when a count value equals the maxtime value corresponding to a internal thread value;

resetting a counter when the count value equals the maxtime value corresponding to the priority thread; and

setting a priority thread value equal to the internal thread value when the maxtime value corresponding to the internal thread value is not equal to zero.

²⁴ ~~23~~ ^{GAP} 23. A thread selection unit for selecting an execution thread from a plurality of active threads in a multithreaded processor, the thread selection unit comprising:

means for selecting a priority thread;

means for selecting the priority thread as the execution thread, when the priority thread is unblocked.

²⁵ ~~24~~ ^{GAP} 24. The thread selection unit of Claim ²⁴ ~~23~~ ^{GAP} further comprising means for selecting a non-priority thread as the execution thread when the priority thread is blocked.

²⁶ ~~25~~ ^{GAP} 25. The thread selection unit of Claim ²⁵ ~~24~~ ^{GAP}, wherein the means for selecting a priority thread comprises:

means for assigning a maxtime value for each active thread;

means for selecting a next thread as the priority thread when the priority thread has been the priority thread for a maxtime number of cycles.

27 ~~26~~ ^{GAP} The thread selection unit of Claim ~~25~~ ²⁶ ^{GAP}, wherein the means for selecting a next thread as the priority thread when the priority thread has been the priority thread for a maxtime number of cycles comprises:

means for incrementing a priority thread counter when a count value equals the maxtime value corresponding to the priority thread; and

means for resetting a counter when the count value equals the maxtime value corresponding to the priority thread.

28 ~~27~~ ^{GAP} The thread selection unit of Claim ~~25~~ ²⁶ ^{GAP}, wherein the means for selecting a next thread as the priority thread when the priority thread has been the priority thread for a maxtime number of cycles comprises:

means for incrementing an internal thread counter when a count value equals the maxtime value corresponding to a internal thread value;

means for resetting a counter when the count value equals the maxtime value corresponding to the priority thread; and

means for setting a priority thread value equal to the internal thread value when the maxtime value corresponding to the internal thread value is not equal to zero.